Volunteer Lake Assessment Program Individual Lake Reports

BEAVER LAKE, DERRY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,760	**Max. Depth (m):**	14	**Flushing Rate (yr^{-1}):**	4.1
Surface Area (Ac.):	134	**Mean Depth (m):**	5	**P Retention Coef:**	0.47
Shore Length (m):	5,800	**Volume (m^3):**	2,707,500	**Elevation (ft):**	287

TROPHIC CLASSIFICATION

Year	Trophic class
1985	EUTROPHIC
1999	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

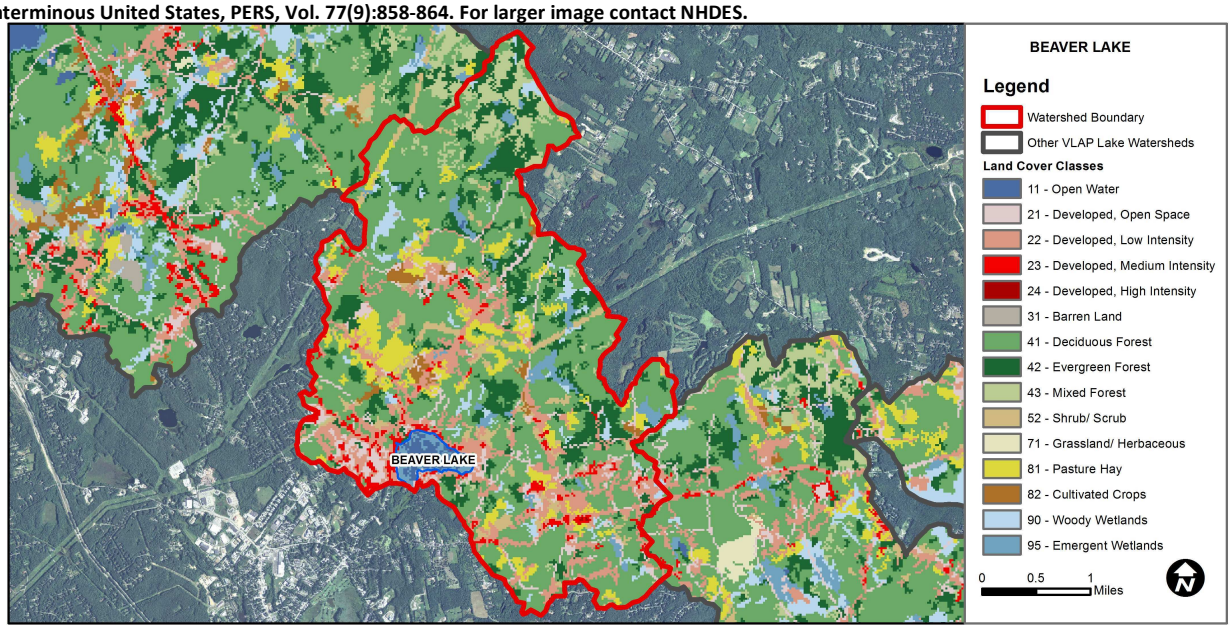
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

BEAVER LAKE - PARK BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
BEAVER LAKE - GALLIEN'S BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.
BEAVER LAKE - COMEAU'S BEACH	Escherichia coli	No Data	No data for this parameter.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	1.13	Barren Land	0.05	Grassland/Herbaceous	0.01
Developed-Open Space	5.16	Deciduous Forest	44.15	Pasture Hay	7.07
Developed-Low Intensity	12.7	Evergreen Forest	12.38	Cultivated Crops	1.1
Developed-Medium Intensity	2.67	Mixed Forest	3.84	Woody Wetlands	2.83
Developed-High Intensity	0.03	Shrub-Scrub	3.77	Emergent Wetlands	3

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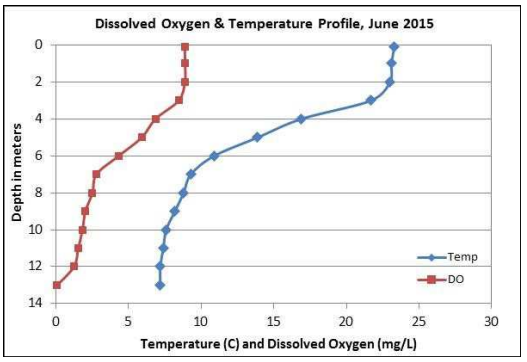
Beaver Lake, Derry

2015 Data Summary

Recommended Actions: Phosphorus and chlorophyll levels were elevated in June following spring snowmelt and a winter with above average snowfall. Phosphorus and chlorophyll levels decreased as the summer progressed with below average rainfall and less stormwater runoff to the lake. Non-point sources of phosphorus in the watershed likely contributed to spring and early summer phosphorus loads through snowmelt and stormwater runoff. Stormwater management efforts should be implemented to reduce stormwater runoff and phosphorus loading to the tributaries and lake. Consider partnering with Soak Up the Rain NH to identify and implement stormwater projects in the watershed. More information can be found at www.soaknh.org. Continue educating lake and watershed residents on ways to reduce phosphorus loading to the lake and proper use of winter de-icing materials to reduce chloride and conductivity levels. Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated in June, decreased to moderate levels in July, and then decreased to low levels in August. The 2015 average chlorophyll levels decreased slightly from 2014 but remained greater than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot conductivity and chloride levels remained slightly elevated and much greater than the state medians, however chloride levels were not greater than the chronic chloride standard. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity with moderate variability between years. Tributary conductivity and chloride levels also remained elevated and much greater than the state medians. Cat-o-Bk. conductivity and chloride were greatly elevated in June following spring snowmelt.
- **Total Phosphorus:** Epilimnetic phosphorus was elevated in June which likely contributed to the elevated algal growth, and then decreased to average levels in July and August. Average epilimnetic phosphorus increased from 2014 and was greater than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Metalimnetic (middle water layer) phosphorus was average in June and slightly elevated in July and August, however within an average range for that station. Hypolimnetic (lower water layer) phosphorus was average in June and July and slightly elevated in August but also remained within an average range for that station. Manter Bk. phosphorus levels were slightly elevated in June following spring snowmelt and in August during stagnant conditions. Jenny Dickey Bk., Cat-o-Bk. and Cat-o-Bk. at Tsenneto Rd. phosphorus levels were elevated in July and August during stagnant conditions.
- **Transparency:** Transparency (NVS) was low in June due to elevated algal growth and July due to wave conditions, and then increased (improved) greatly in August. Average transparency decreased slightly from 2014 and was slightly higher (better) than the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years. Transparency measured with the viewscope (VS) followed the same pattern as NVS transparency but was generally much higher (better) and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in June due to the elevated algal growth and then decreased to lower levels by August. Metalimnetic turbidity was low in June, and slightly elevated in July and August likely due to algal growth. Hypolimnetic and Manter Bk. turbidities were within an average range for those stations. Jenny Dickey Bk., Cat-o-Bk., and Cat-o-Bk. at Tsenneto Rd. turbidities were elevated and in July and August during stagnant conditions.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units however metalimnetic and hypolimnetic pH levels were slightly less than desirable. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years. Tributary pH levels were all within the desirable range.



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

Station Name	Table 1. 2015 Average Water Quality Data for BEAVER LAKE								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	23.3	5.68	47	229.7	15	3.58	4.63	1.32	7.02
Metalimnion				210.2	16			1.82	6.41
Hypolimnion				215.4	17			2.66	6.38
Cat O Brook			121	602.5	65			12.86	7.11
Cat O Bk @ Tsenneto Rd			48	319.0	53			7.04	6.97
Jenny Dickey Brook			67	303.0	107			9.35	6.73
Manter Brook			46	222.7	18			1.48	7.00

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m^3

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.